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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/031,363	07/01/2002	Gary Lock	5621	6875

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EXAMINER

OLSEN, KAJ K

ART UNIT PAPER NUMBER

1753

DATE MAILED: 11/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/031,363

Applicant(s)

LOCK ET AL.

Examiner

Kaj K Olsen

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 13-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9 and 14 is/are allowed.
- 6) ☒ Claim(s) 1-11, 13 and 15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
3. Claims 1-8, 10, 11, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over either SU '285 or GB '355 in view of Schram (USP Re. 33,524).
4. SU '285 discloses a method of manipulating particles comprising subjecting the particles to both ultrasonic vibrations and to a varying electric field that induces a dielectrophoretic force. See the figure and the abstract. Similarly, WO '355 teaches the subjection of particles to a dielectrophoretic force and also teaches that the force can be additionally joined with other forces such as ultrasonic. See p. 4, lines 11-14. An ultrasonic force is inherently a vibrational force. SU '285 and GB '355 do not explicitly disclose the use of a moving ultrasonic standing wave. SU '285 is presumably drawn to a stationary standing wave (in view of the use of a fixed frequency)

and GB '355 does not specify any particular form of ultrasonic vibration. However, the use of moving standing waves for particle separation is old in the art. In particular, Schram teaches that utilizing moving ultrasonic waves allows one greater separation of the particles based on their ultrasonic properties. See abstract and col. 4, lines 46-66. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Schram for the method of either SU '285 or GB '355 in order to allow for greater particle separation than would be possible with the use of stationary standing waves. In addition, moving waves allow one to move particle without the need for a separate flow impelling means.

5. The various claims drawn to how or when the ultrasonic waves are applied at different times are all within the purview of one possessing ordinary skill in the art. In particular, both techniques provide separation to different particles in different ways. Whether the ultrasonic vibrational separation is performed before or after the dielectrophoretic separation ) entirely depends on which sequence provides greater separation of the particles. Although SU '285 appears to teach applying the vibrations and the dielectric force at the same time, one possessing ordinary skill in the art would recognize that either force can be cycled on or off provided one is willing to forgo the advantages of having both forces applied at the same time.

6. For the claims drawn to applying these forces at the same time, both SU '285 and GB '355 set forth applying the forces at the same time. In SU '285, see abstract, in GB '355 see p. 4, lines 11 and 12.

7. Claim 11 is rejected in the alternative under 35 U.S.C. 103(a) as being unpatentable over SU '285 with or without the teaching of either GB '355 or Schram.

8. Claim 11 is rejected in the alternative under 35 U.S.C. 103(a) as being unpatentable over GB '355.

9. SU '285 sets forth all the limitations of the claim, but apparently does not teach the use of different frequencies. According to the applicant, SU '285 utilized the same frequency in order to garner maximum field strength (see pp. 3 and 4 of the disclosure). However, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize different frequencies if one is willing to forgo the maximum field strength that one gets utilizing the same field frequency. Taking a step back in the art requires only routine skill.

10. Alternatively, both GB '355 and Schram provide motivation for why one would want to vary the frequency utilized for the dielectrophoretic force and ultrasonic vibration respectively. In particular, GB '355 teaches that varying the frequency allows one to maximize the collection (fig. 4a-4c). Schram teaches that varying the frequency allows one to find the optimize the separation (see abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to vary the frequency of either the ultrasonic vibration or dielectric force (as taught by GB '355 or Schram respectively) in order to tailor the frequencies such that maximum separation can be achieved. If it is obvious to vary the frequencies, then utilizing different frequencies would inherently follow.

***Allowable Subject Matter***

11. Claims 9 and 14 are allowed in view of the applicant's amendment. The reasons for allowance can be found in the previous office action.

***Response to Arguments***

12. Applicant's arguments filed on 9-12-2004 have been fully considered but they are not persuasive. With respect to WO '355, applicant urges that this reference does not describe a particle separation method as in the present invention. First, this issue is moot because applicant is not claiming a method of separating particles. Using claim 1 as an example, applicant is claiming a "method of *manipulating* particles comprising *subjecting* particles... to a moving ultrasonic standing wave and to a varying electrical field" (emphasis added). Neither "manipulating" nor "separating" are synonymous with --separating--. All that is necessary to read on the claimed invention is the application (or suggestion) of applying both the ultrasonic wave and electric field for whatever reasons. Second, the examiner does not agree that WO '355 is not drawn to separation. The method of WO '355 is explicitly disclosed for the separation of particles. See p. 2, line 17 through p. 3, line 2. WO '355 further discloses that additional forces may be utilized to *enhance the movement* of the particles (p. 4, lines 11-14). That enhancement is presumably also a separation because that is what WO '355 is disclosed for and because the various disclosed additional means (specifically ultrasonic) are all well-known separation means (see Schram).
13. With respect to the teaching of SU '285, applicant urges that the geometry of SU '285 would not permit the production of a traveling ultrasonic wave. First, applicant has not provided any evidence as to why SU '285 would be incapable of providing a traveling wave. What is the basis for the applicant's contention that the traveling waves require larger spacing than that of the transducer of SU '285. Second, even if the examiner accepted this conclusion the applicant suggested, there are a myriad of different transducers known in the art. Just because one

transducer in the art (i.e. SU '285) would be incapable of providing a traveling wave doesn't mean other known transducers in the art (e.g. Schram) wouldn't have been an obvious choice for a transducer.

14. Applicant also urges a number of reasons why SU '285 would not have utilized a traveling wave for its device. However, these various arguments would appear to be almost circular in logic. In particular, it appears that applicant is urging that because SU '285 limited themselves to a standing wave vibration, one possessing ordinary skill in the art would not have looked to traveling waves because SU '285 utilized standing waves and those standing waves had particular requirements that do not mesh with traveling waves. Hence, SU '285 cannot render the claims obvious because they don't anticipate the claims. It appears the applicant is missing the larger basis for this obviousness rejection. In particular, if one possessing ordinary skill in the art recognizes that the use of traveling waves as an art recognized alternative to the standing waves of SU '285 (as Schram is being utilized for), it would appear that the various geometrical considerations of SU '285 that the applicant is relying on become moot. For example, applicant urges that SU '285 wants a pressure wave node centered on the wire electrode. That may be the case for SU '285, but this requirement would presumably be moot with the use of a traveling wave because traveling waves do not have fixed nodes. Similarly, applicant urges that SU '285 must have identical ultrasonic and dielectrophoretic frequencies with particular phase relationships in order to maximize the ability to separate. Again that may be the case, but this requirement would appear to become moot when one utilizes a traveling wave with variable ultrasonic frequency.

15. Applicant also urges that SU '285 requires fluid flow or only operates on a small fraction of the particles unlike the instant invention. Regardless of whether this were true or not (and whether this conclusion is based on SU '285's use of standing waves), the examiner fails to appreciate how this distinction has been claimed.

16. Applicant argument against Schram is that it doesn't overcome the shortcomings of SU '285 or WO '355. Because these arguments were not persuasive (see above), this argument against Schram is similarly unpersuasive. The examiner would also point out with respect to the combination of SU '285 and Schram that applicant has only individually attacked each teaching for failing to disclose the claimed invention when the rejection is based on a combination of the two teachings. Unobviousness cannot be established by attacking the references individually when the rejection is based on a combination of references. *In re Novak* 16 USPQ 2d 2041, 3043; *In re Keller* 208 USPQ 871 (CCPA 1981); *In re Young* 159 USPQ 725.

### ***Conclusion***

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37



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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Thursday from 5:30 A.M. to 3:00 P.M. and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AU 1753  
November 26, 2004



**KAJ K. OLSEN**  
**PRIMARY EXAMINER**